NON-PUBLIC?: N
ACCESSION #: 9108010295
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Point Beach Nuclear Plant, Unit 1 PAGE: 1 OF 04

DOCKET NUMBER: 05000266

TITLE: Unit 1 Reactor Trip on Loss of 1-DY03 White Inverter
EVENT DATE: 06/29/91 LER #: 91-008-00 REPORT DATE: 07/29/91

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Norm L. Hoefert, Manager-Operations TELEPHONE: (414) 755-2321

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: EE COMPONENT: INVT MANUFACTURER: E209
REPORTABLE NPRDS: Yes

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On June 29, 1991, while operating at 100% power, an automatic reactor trip occurred on Unit 1 at 6:38 P.M. The reactor trip was caused by the loss of power from 1DY03, the inverter supplying power to the "white" instrument bus. The loss of power to this bus resulted in a steam flow to feed flow mismatch coincident with a low steam generator water level on the "B" steam generator, resulting in a reactor trip.

The instrument bus was transferred to the spare inverter, DY0C, and Unit 1 was started up and returned to service at 11:52 a.m. on June 30, 1991. Full power was achieved at 2:15 a.m. on July 1, 1991. Currently, power to the "white" instrument bus is being supplied by the spare inverter.

END OF ABSTRACT

EVENT DESCRIPTION

On June 29, 1991, both Unit 1 and 2 were operating at 100% power. 1DY03, the inverter supplying power to the Unit 1 "white" instrument bus, automatically shutdown, causing a loss of power to the "white" instrument bus. The loss of power caused a power range nuclear instrument channel to fail low which resulted in a turbine runback from 100% to 80% power from the NIS dropped rod circuitry. The runback caused the steam dump system to arm. The Tref instrument also failed low generating a Tref to Tavg mismatch, resulting in the steam dumps opening. This resulted in a steam flow to feed flow mismatch. This mismatch, coincident with the low steam generator level signal for the B steam generator that occurred upon loss of the instrument bus, caused the reactor trip. Because this low steam generator level signal occurred upon loss of the instrument bus, the reactor trip occurred before an actual low water level existed in the "B" steam generator.

Immediately following the reactor trip, a safety injection signal initiated because of decreasing RCS pressure as a result of the primary plant cooldown. This cooldown was caused by the automatic initiation of auxiliary feedwater system flow on lo-lo steam generator level following the reactor trip, and the opening of the steam dumps. All the pressurizer heaters were locked out when the instrument bus was lost, preventing the heaters from compensating for the decreasing pressure. No injection to the RCS occurred since RCS pressure remained above the shutoff head of the SI pumps. All other plant systems responded to the loss of power from the "white" instrument bus and reactor trip as expected.

The reactor was placed in hot shutdown at 8:47 p.m., the "white" instrument bus was shifted to the spare inverter, DY0C. The post trip review was conducted, and the reactor startup was commenced at 12:44 a.m. on June 30, 1991. Criticality was reached at 6:23 a.m., and Unit 1 was returned to service at 11:52 a.m. Full power was achieved at 2:15 a.m. on July 1, 1991.

COMPONENT AND SYSTEM DESCRIPTION

The 120 volt AC instrument supply system is made up of sixteen buses, divided among four channels. These channels are designated red, white, blue, and yellow, and they are each allocated four buses. The four channel buses are further subdivided into two bus groups, one supplying Unit 1 and the other serving Unit 2. One inverter is dedicated to the Unit 1 bus group and a second is dedicated to the Unit 2 bus group. The third inverter acts as a spare, and it can swing between both units' buses. This spare inverter allows either dedicated inverter to be taken

out of service for maintenance.

Inverter 1DY03 is an Elgar Model 253-1-103, 125 Vdc to 120 Vac, single phase, 60 Hz inverter. The Energy Industry Identification System component identifier and system names for the system, component, and manufacturer are:

Inverter: 1DY03
System: EE
Component: INVT
Manufacturer: E209

CAUSE AND CORRECTIVE ACTIONS

While the loss of 1DY03 and the subsequent loss of the "white" instrument did not immediately cause the reactor trip, it was ultimately responsible. Following the reactor trip, a post-trip review was conducted, and the reactor was returned to service. Further review of the event has shown that the effects of the loss of the instrument bus was as expected and the plant systems functioned properly to shut down and maintain the reactor in a safe shutdown condition.

After the reactor trip, the "white" bus was transferred to the spare inverter. Once this occurred, 1DY03, the normal inverter again powered up. At this time it was running unloaded. This inverter will power down on an external fault if an overload condition occurs, and it will power up once this fault clears. This would indicate that an external fault existed on the instrument bus, and that this fault caused the inverter to power down, resulting in a loss of power to the instrument bus.

Inspection of the inverter revealed that the output breaker did not trip at 125% load in response to the potential overload condition. The automatic shutdown feature functioned as designed in this situation. The inspection also revealed a problem with a slightly low out of specification voltage on the DC-DC converter. The output breaker problem occurred because the time delay setting for the overload trip was improperly set, resulting in an infinite time delay. The overload breaker trip function has been adjusted and verified in accordance with the manufacturer's recommendations. The DC-DC converter problem does not appear to affect operation of the inverter. We are addressing this issue with Elgar, the manufacturer. At this time, the spare inverter is supplying power to the "white" instrument bus and 1DY03 is running, supplying a dummy load. No problems have been noted.

The cause of the inverter failure is still undetermined. The Elgar Corporation will be consulted on additional testing that can be performed to diagnose the problem. If additional information is obtained and the cause of the inverter problem determined, a supplemental LER will be submitted.

We are planning the installation of static transfer switches which will automatically transfer an instrument bus to an alternate source should an inverter failure or trip occur. once installed, these should prevent loss of power to an instrument bus causing a reactor trip.

REPORTABILITY

This Licensee Event Report is being filed in accordance with 10 CFR 50.73 (a)(2)(iv), "Any event or condition that resulted in the manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System." Additionally, the NRC was informed of this event in accordance with 10 CFR 50.72(b)(2). The resident inspector was also informed.

SAFETY ASSESSMENT

There are no safety consequences from this event. All plant systems functioned and responded as designed. The health and safety of plant personnel and the public were not endangered.

SIMILAR OCCURRENCES

A review of similar Licensee Event Reports was performed. A list of these reports follows:

LER # UNIT SUMMARY OF EVENT

86-003-00 1 Inverter 1DY03 tripped when inverter DY0C was incorrectly restored to operation-reactor trip.

86-003-00 2 Inverter 2DY03 tripped because of paralleling improperly with spare inverter-turbine runback.

86-006-00 1 Improper transfer of power from 1DY03 to DY0C-turbine runback.

87-004-00 1 Voltage spike on DC bus while shutdown trips both 1DY01 and 2DY01.

89-001-00 2 Improper restoration of power following maintenance to 2-DY03-turbine runback.

91-005-00 1 Failure of 1DY01 because of several shorted diodes and blown fuses-reactor trip.

In the above list, the first three Licensee Event Reports involve inverters manufactured by the Elgar Corporation and the remaining reports involve inverters manufactured by Westinghouse.

ATTACHMENT 1 TO 9108010295 PAGE 1 OF 1

Wisconsin
Electric
POWER COMPANY

231 W. Michigan, P.O. Box 2046, Milwaukee, WI 53201 (414) 221-2345

VPNPD-91-239 10 CFR 50.73
NRC-91-071

July 29, 1991

Document Control Desk

U. S. NUCLEAR REGULATORY COMMISSION
Mail Station P1-137
Washington, DC 20555

Gentlemen:

DOCKET 50-266
LICENSEE EVENT REPORT 91-008-00
UNIT 1 REACTOR TRIP ON LOSS OF 1DY03 INVERTER
POINT BEACH NUCLEAR PLANT, UNIT 1

Enclosed is Licensee Event Report 91-008-00 for Point Beach Nuclear Plant, Unit 1. This report is being furnished in accordance with the requirement of 10 CFR 50.73(a)(2)(iv), "Any event or condition that resulted in the manual or automatic actuation of an Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)."

This event occurred when the Unit 1 reactor tripped as a result of the loss of power to the Unit 1 white instrument bus caused by the inverter supplying the bus automatically shutting down.

Please contact us if you have any questions on the event or on our corrective actions.

Very truly yours,

C. W. Fay
Vice President
Nuclear Power

Enclosure

Copy to: NRC Resident Inspector
NRC Regional Administrator

A subsidiary of Wisconsin Energy Corporation

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